Making stream of production-14.
Kanban system-2

I would write the kanban system a little more.
But after this description, I leave from the description of TPS in Making Stream of Production a little while and will describe the Factory Management from next.
I know that the description of Kanban system is not finished.
I need to write the push kanban (Production End kanban, Make-to-Order kanban) and others useful and necessary kanban accessory systems.
Also I need to describe other TPS issues such

> Production Control and Te-ban, Machine and Human Resources, Task of Manager & Supervisor, Safety, (3 G) Gemba Genbutsu & Genjitsu, Process Stability, Abnormality Control, Inspection and Poka-Yoke, Standardization and Problem Solving, 5 Whys, Initial Products (Quality) Control and New Model Development, SMED, True Efficiency, Gemba Transportation, (3 M) Muri Mura Muda, Machine Equipment Kaizen and Jidoka, Multi-Skill and Multi-Process, Flexible Layout, Kaizen and Stability, PM (Preventive Maintenance), Cost Control, KPIs, Gemba-Ryoku, 3S (CS, ES, SS), Introduction Method of Available TPS Technique.

Particularly you may have the interest how can we use the push kanban with Te-ban control and normal kanban in mixed in the Production Control, also the Introduction method of (Available) TPS Technique.

> ※Available TPS Technique: Suitable and possible techniques for the company.

I will explain these in the case of the company (President; C. Wilkins). However. These are duplicated with the Factory Management themes.
For your better understanding of total picture of TPS, I would explain the Factory Management which is also important and essential lean management methods.
Therefore from next, I write Factory Management.
※If you don't want to receive it, please feel free to express. I will delete your name from my mailing list.
Now.
In the last edition and in the comparison with the conveyor production, I wrote the function of kanban as follow.

1) To identify the necessary production and quantity.
2) To identify the necessary timing of the production.
3) The function of name tag.
4) Synchronize between relevant processes.
5) One of kaizen tool (which identifies the necessity and timing of some improvement).
6) Stock & Inventory control.
7) Automatic (Autonomic) nerve of adjustment for the production fluctuation.

And the kanban is very convenient if we use it properly. And the normal kanban (process and withdrawal kanban) is well known and taught in the world. However. In the trend of teaching kanban, there are 2 adverse effects.
One is the teaching that the normal kanban is as all.

This is wrong.
As I describe later, even Toyota, Production End kanban and Make-to-Order kanban in push and Te-ban control are necessary in the total kanban system.
Kanban system never deny the Te-ban control system which is "push".
※Normal kanban (Production Order and Withdrawal kanban) is pull system and replenishment pull system.

Another one is the normal kanban is taught as almighty which is possible to apply for any cases.

It is also wrong.
And there are some constraints for implementing normal kanban.
The constraints condition are
(1) The productions are stabilized under the stabilized demand.
(2) These products demands are stabilized (continuous) in some long term.
(3) These have the long term lifecycle.
(4) Small monthly demand fluctuation including seasonal variation.
I have written the failure case of kanban introduction.
This tool maker company introduced the kanban system in very hard effort, however he gave up to continue the kanban system.
This company also has both products of the good sellers and low and/or special demands which are very low demand frequency and intermittent.
In the process of kanban introduction, he adopted the normal kanban for all products.
As you understand, (normal) kanban in pull requires to have the inventory.
Then
Under the name of kanban system, the inventories for all products (including low and special demands) were provided.
And as the results, the Inventory Turnover Ratio and Cash-Flow were worsen.
The process LT was improved very much. But in spite of the improvement of the process LT, the material LT was deteriorated.
The short lifecycle (of the good sellers products) also was one of failure cause.
He noticed the lack of the system which applied the normal kanban for entire control and the necessity of something other additional method.
But he believed that the normal kanban is the very kanban system and possible to apply to any case.
And he didn't know the total kanban system which includes Production End kanban and Make-to-Order kanban in push and Te-ban control.
And he didn't know the necessity of the combination of Normal kanban and these One cycle kanbans in the normal factory which has both products of "Repeated and Continuous" and "Low frequent and Intermittent".
If he had known the total kanban system and One cycle kanban (Push kanban; Production End kanban and Make-to-Order kanban), he would have used these for the intermittent and/or special demands and would have succeeded the factory control in kanban system.

All of the textbook to be on sale describes only the normal kanban and not describes total picture of kanban system.
Additionally all of the textbook teaches that kanban is pull.

It is quite natural to have the product's lifecycle. And when the products are coming to the end of the lifecycle, it is not possible to continue the kanban in pull.
And it is quite natural to have the demands of spot, low frequent and intermittent in a business.
In such case, (normal) kanban is not suitable. And the limited kanban such Production End kanban, Make-to-Order kanban or One cycle kanban which are not pull but push in Te-ban control must be used.

These are the basic causes of the kanban failure cases.
Please understand that kanban system is constituted of not only the pull system (normal kanban) but also the "push system" (Te-ban control. Production End kanban and Make-to-Order kanban).
Now.
I picked up the 5 items of essential condition for stabilize the kanban system as follow.
1) Heijunka
2) Correct understanding (for the mixed demand conditions: not only the continuous and repeated demands but also ----.
3) Kaizen constitution (especially QRKA).
4) Documentation control capacity (for frequent kanban change).
5) 5Ss and education & training in gemba.
And I explain one by one.
1) Heijunka.

I already described this in the last edition (-13.), but once again.
The basic condition of kanban system is Heijunka based on a certain level forecast.
And for Heijunka, the demand forecast, production plan are necessary.

Note) In Toyota, the Production plan and the Sales plan are same.

As I describe later, the number of car Production and Sales plan are same in Toyota.
In a production, the most important thing is to know the final demand quickly and properly because the proposition of production system is to exchange the demand information to the products efficiently and in timely.
The most important issue of Production Control is "How can we synchronize in between the demand and the production.
It is quite unique thing that the production plan and sales plan are same. And I believe this system was completed at the merger of Toyota Jikou (Toyota car manufacturing) and Toyota Jihan (Toyota car sales) and to be established the current Toyota Motor Corporation (TMC) in 1982.

Ji(Jidosha); Car. kou; manufacturing. han (hanbai); sales.

Then
Before 1982, Toyota also had both of Production plan and Sales plan.

As I have described, Heijunka is made based on the sales forecast which the ratio of discrepancy is allowed in the range of 10%.

This sales forecast enables to make Heijunka.

Note) Deny sales forecast?

There is the opinion of denying sales forecast. But it is wrong.

Now I would present a memorable occurrence in my TPS training course for your reference.

The unforgettable happening was occurred at the first step (decision of theme).

I use the method of "Non-teaching Class" which is done by themselves from the decision of the theme, discussion and building up the KJ diagram, conclusion in KJ method and presentation with the KJ diagram.

They (group members; one group maximum 5 persons) are required to find out the solution as the conclusion and to make their presentation to other groups.

This time I reproduce (from the voice record of a student) and present the case of deciding theme of the group (5members; A, B, C, D, E.)

Person A: I have been required the solutions to improve the production planning by my company. In my company the major cause of bad Inventory Turnover is the production planning which is based on the sales forecast. Then I wish to discuss "the improvement of sales forecast accuracy and production plan.

Person E: So bad accuracy? How is the percentage of the accuracy?

A: Depends on the month terrible fluctuation. Teacher (He called me). How can I teach them (the members of production planning Dpt. of his company) to improve the production plan accuracy based on the accurate forecast?

B: Wait a minutes Mr. A. Why do they need the sales forecast? We are learning Lean in TPS in this class.

And I believe Lean is pull system.

You also should teach them the lean concept.

And Lean recommends to eliminate or reduce Muda in its 5 steps.

Lean Lean Lean -----

----- Omit. (He explained Lean in the lean book.)

A: I understand the contents of the lean book which explains the important 5 steps and also Toyota Production System.

And they (Production Planning dep.) also understand the lean concept (in the lean book).

But they raised one question how to prepare the necessary materials, parts and labour capacity and machines.

They promised to introduce the pull system in having inventory.

Also we (our company has) have abundant inventory of finished products , raw materials and WIP actually.

These abundant inventory and WIP bear most severely on the management.

C: You told us the necessity of accurate production plan and forecast, didn't you?
It is impossible to seek the accurate forecast. It is impossible.
B: I agree with Mr. C.
Therefore the lean concept recommends "pull" in short LT.
Your production plan also needs to obey the replenishment pull system.
A: Then! Your opinion is us to be reconciled to the managerial situation of abundant inventory and WIP and the managerial crisis.
The abundant finished products and WIP is never the situation of lean, isn't it?
Does Lean accepts the abundant inventory and WIP which are caused of the obsolescence and scrap/loss?
My aim to participate to this course is to find the solution of this managerial crisis.
E: To reduce the inventory, normal inventory control is better than the lean concept, isn't it?
A: Normal inventory control?
Yes you are right. And the normal inventory control is constituted of the Current inventory, Prediction of demand, Current Order (in process, remaining order), Safety stock.
And these are based on the forecast. Am I right?
I understand that it is not possible to seek "accurate forecast" and one of solution is to shorten the LT. But.
I believe that the improvement of forecast accuracy also is important.
Then please accept to take up this matter.
B: But we are discussing the matter of Lean.
And your production plan also should adopt the lean concept which is to reduce the Muda in the lean 5 steps.
A: Right then I would ask you.
In so-called Lean, it is to seek the elimination of Muda and maximizing the value to customer, isn't it?
Also the method is pull system. Am I right?
Pull and replenishment pull system require the inventory.
Isn't the inventory Muda, is it?
B: Of course as we were taught in TPS and Lean, any inventory is Muda.
A: So it is right!
Additionally TPS refers Muda with through the Inventory which is one kind of mirror.
It is raised in 7 wastes.
And it teaches us that the root of all evils is Inventory.
But Inventory is related to the demand forecast.
E: UM-----.
In 7 Wastes there is the item of "Muda of Inventory". But.
(Normal) kanban system is "pull and replenishment pull system" which requires to have inventory.

The lean book also taught us the lean situation which is that the customer can pull his necessary things in JIT.
And the solution is to shorten the process LT.
Therefore it is possible to solve the inventory problems in the improvement of LT. Am I right?

B: Yes. I agree with the opinion of Mr. E.
Mr. A, you should implement the LT improvement in your company rather than seeking the solution of "accurate forecast", shouldn't you?

A: First of all I agree with the opinion of LT improvement.
Completely I agree. But. But. But!
Tell me how can I prepare the raw material, labour capacity and machine capacity?
OK, ok! Let's suppose that we have miracle machines which are not necessary any changeover time but unfortunately have the machine run time. And suppose that the LT of "waiting, changeover are close to zero infinitely.
Even in such supposition I need to make the production plan for preparing assembly workers and machine operators.
How can I prepare the operators and workers to respond the fluctuated demand?

B: Therefore we recommend you to make the production plan in replenishment pull which requires to replenish just things pulled.
Just things pulled is not so big volume production, isn't it?

A: Everybody.
I have told you my problems.
I cannot accept the current inventory level which becomes from the production plan based on forecast. Actually the inventory level is quite high.
The pull fluctuation wave also quite high.
I understand that I might not be able to find the solution in this course.
I quit! Because it is no meaning for my company.

(Interruption)

I describe this continuance after.

Anyway there are many misunderstanding regarding the lean concept and TPS world widely.

In this debate many things were raised.

-Is Lean constituted of just pull?
-Can sales forecast be neglected in the production activity?
-Is it sufficient enough to improve inventory situation with just LT improvement?
-Is sales forecast and production planning no necessary?
-Is it enough to give the production plan to only the final process?
-And is the middle process (including parts preparation) no necessary to have the production plan because of the pull and replenishment pull system?

-Are the parts and/or raw material suppliers no necessary to receive the production plan from their customer?
-Is "pull" lean?
-Is TPS same to Lean?
-Is "5 steps" of the lean book equal to TPS?
And I explain one by one.
-Is Lean constituted of just pull?
    Of course not. Push system also should be used properly.
    Pull system requires having inventory and WIP.
    In unknown customer pull (which is caprice and has Mura), push system also must be used properly.
-Can sales forecast be neglected in the production activity?
    No, it is not correct.
    It is necessary for Heijunka planning and the calculation of kanban. And also.
    It is necessary to provide production capacity (labour, machine) and material planning, and investment planning.
    The accuracy of sales forecast (forecast of customer pull) is one of issue; however, it is necessary even LT is improved.
-Is it sufficient enough to improve inventory situation with just LT improvement?
    No it is never sufficient.
    Customer pull is caprice and has Mura. And for responding these demands in JIT, the inventory can't be neglected even though the ultimate LT is improved.
    Customer requires zero LT to gain his or her wish. On the other hand production LT can't be zero even though it is near to ultimate.
    And there is the gap. Then to have inventory can't be neglected. However, It is necessary to minimize the inventory or WIP level.
    LT reduction is one of essential theme but is not sufficient enough in the condition of caprice & Mura and unknown demand.
    To pursue the accuracy of demand forecast is also important.
-Are sales forecast and production planning no necessary?
    Of course these are necessary.
    The contents of production plan is constituted of
        Production schedule,
        Production capacity plan (Labour, machine & equipment; excess or shortage capacity and countermeasures),
        Materials preparation,
        Suppliers,
        Inventory plan (Turnover ratio and countermeasures, excess and obsolescence inventory and countermeasures, material problem solving),
        Information (New design and/or obsolete design & products, parts and materials and countermeasures),
        Machine maintenance schedule.
        For making the production planning, sales forecast is important even though it is not so good accuracy.
-Is it enough to give the production plan to only the final process?

Of course production plan should be shared by all processes because of proper preparation and countermeasures.
However production plan and production order are different.
And production order is made with kanban in pull or te-ban in push.

-And is the middle process (including parts preparation) no necessary to have the production plan because of the pull and replenishment pull system?
Of course production plan should be shared by all processes even though the processes are constituted of pull and replenishment pull.

-Are the parts and/or raw material suppliers no necessary to receive the production plan from their customer?
If they provide sufficient inventory which can recover any order (high) with the preparedness of bad turnover or if they can employ the witches of Cinderella story who can produce necessary things with magic, the suppliers doesn't need to receive the information and can respond to any order in JIT.

-Is "pull" lean?
Pull system and replenishment pull are not possible always to say lean situation because pull system requires to have inventory.
Pull system is one of important method to seek lean situation, just because,
It is not possible to say that "pull" always promises lean.

-Is TPS same to Lean?
TPS and Lean are not same.
TPS has its concept and one of method to seek lean situation.
Lean is just concept.

-Is "5 steps" of the lean book equal to TPS?
No. The problem is the step 4 "Pull".

Now going back to this debate.
I told to Mr. A and made a small presentation to all groups.
To Mr. A.
The purpose of this course and group discussion is not the seeking proper countermeasure (his desire is to improve the forecast accuracy in his business.), but identifying the thought and methods of Lean Management.
To all groups.
But his problem presentation is quite good in suggestion.
Therefore let us consider the importance of forecast improvement with my short presentation.
My presentation.
Everyone, I have a favorite which is TOFU and I think you know this healthy Japanese food. You know, don't you?
And in my favorite of favourites is YOSE-TOFU.
My Japanese friend manages a company of TOFU production and had one of serious problem. The problem was the Waste of TOFU which amounts to $300 Thousands per season.
$ 300 Thousands each season!
He desired to reduce this finished products scrap.

More than anything, he felt the sense of guilt for food wastes which are still eatable.

Wasting eatable foods!

This problem is one of serious problem in days of plenty and for the countries in satiation world widely.

Japan also is in satiation and wastes 6.8 million tons eatable foods per year.

Anyway he (the TOFU Company) desired to reduce this waste.

Why still eatable TOFU is wasted and discarded? Because.

Japanese likes to eat raw TOFU. Particularly YOSE-TOFU is specialized to eaten raw.

Then consumer chooses the YOSE-TOFU which the produced date is in the day or at last yesterday in the shelf of supermarket. Also the days of best before end is so short (one week in refrigerator).

And the YOSE-TOFU which is past 3 days isn't bought by consumers. Consumer doesn't do Fi-Fo in the shelf.

Japan is a country of eaten raw culture (SASHIMI, SUSHI, Raw egg etc.)

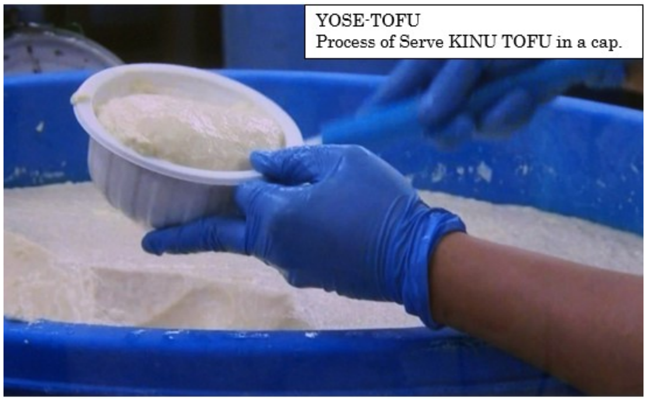
Then

The YOSE-TOFU which is past 3 days is discarded even though in the days of best before end.

He intended to reduce this TOFU waste and as the first attempt, chose YOSE-TOFU.

YOSE-TOFU.

There are several kinds of TOFU in the different production methods and processes. And YOSE-TOFU which is seasonal product (hot season) is specialized for just Eaten Raw.



YOSE-TOFU

Process of Serve KINU TOFU in a cap.

KINU TOFU

Correctly it is called Kinugoshi-TOFU. Kinu; silk. Goshi (koshi); filtering.

In the production process, it is necessary to filter to make soy milk. When filtering, silk cloth is used to make very smooth feeling on the tongue.

Production line for YOSE-TOFU. Saying production line. But just packaging process is automated. Others are by hand.

YOSE-TOFU packed. On the conveyor.

YOSE-TOFU in container for shipping preparation.

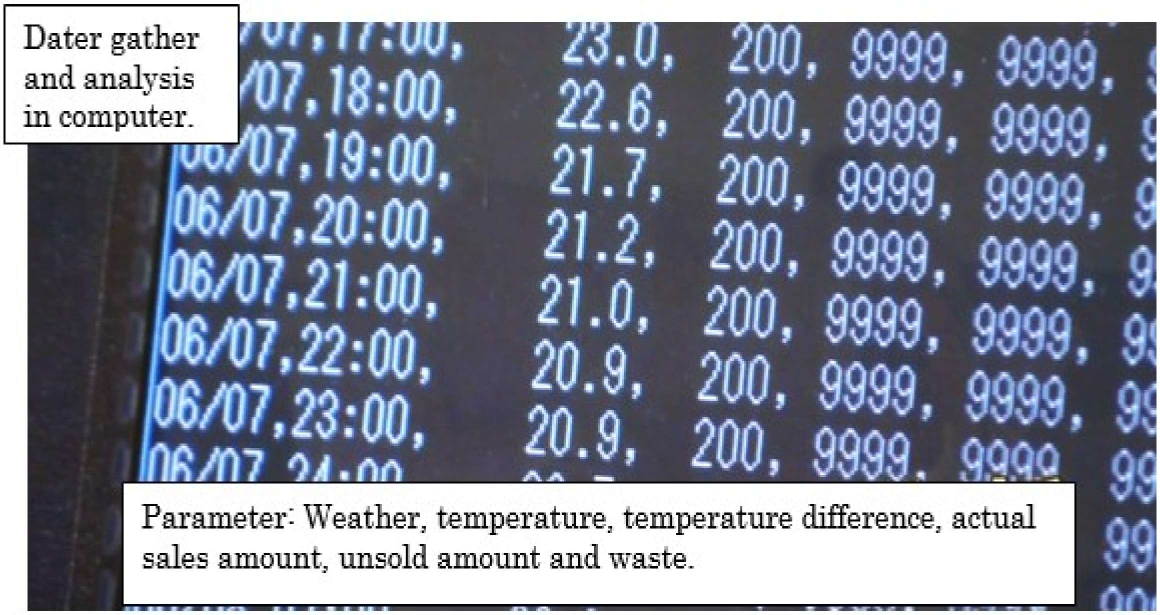
He succeeded to reduce the waste more than 30%. But how?

He could improve the accuracy of forecast.

> He does pull and replenishment pull system in forecast.
>
> The minimum stock of replenishment pull was decided with bad accurate forecast.
>
> The production planner decided the production plan by his experience, past tendency and intuition.

How improved the accuracy of forecast?

He tied up with a weather forecast company.



Dater gather and analysis in computer.

```
 /07,17:00,   23.0,  200, 9999, 9999,
 /07,18:00,   22.6,  200, 9999, 9999,
 /07,19:00,   21.7,  200, 9999, 9999,
06/07,20:00,  21.2,  200, 9999, 9999,
06/07,21:00,  21.0,  200, 9999, 9999,
06/07,22:00,  20.9,  200, 9999, 9999,
06/07,23:00,  20.9,  200, 9999, 9999,
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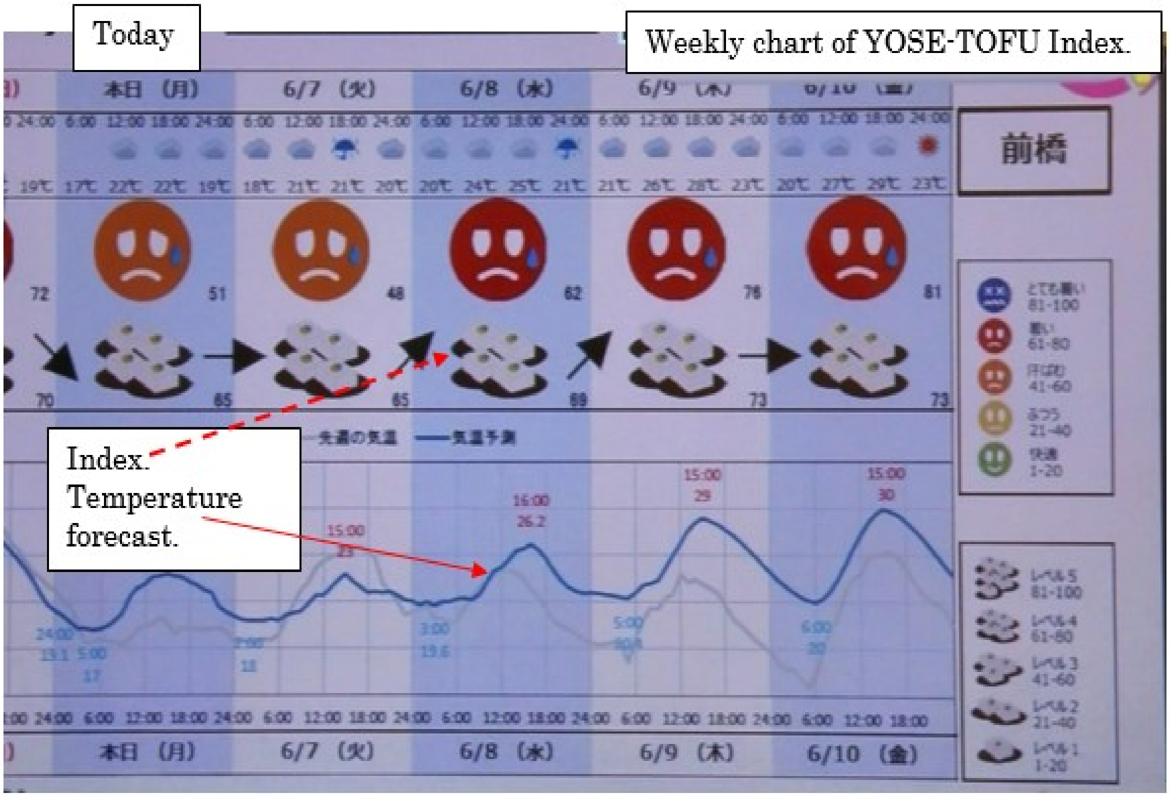
Parameter: Weather, temperature, temperature difference, actual sales amount, unsold amount and waste.

Then they found one of key parameter which is the change of temperature rather than simply high or low.

And they made the YOSE-TOFU index as follow.



Today

Weekly chart of YOSE-TOFU Index.

Index.

Temperature forecast.

Production planner. Based on the Index chart, he planes and revises the weekly and daily production

For instance
When comparing the temperatures of 6/7 (23℃) & 6/8 (26℃) and 6/9 (29℃) & 6/10 (30℃), the differences are
6/7 & 6/8; 3℃
6/9 & 6/10; 1℃.
Then the sales forecast is high at the 6/8 and is low at 6/10.

As the result.
This TOFU Company could reduce the waste more than 30% and save the cost of 10 million yen in this product YOSE-TOFU.
He said

> It is never sufficient and necessary to improve the sales forecast accuracy more.
> Also we have already expand this activity for other products.

With through my short presentation I taught the importance of sales forecast to the groups.
Note) Sales forecast.

> In the lean book TPS is presented as lean. And this lean book presents that Lean is TPS and TPS is equal meaning to Lean.
> This lean book has 2 major defects which induces misunderstandings. The source of serious misunderstanding is next sentence.

THE FIVE STEPS OF LEAN IMPLEMENTATION

Step 4: Pull

Let the customer pull products as needed, **eliminating the need for a sales forecast.**

> (Next process also the customer)
> This sentence in JIT induces serious misunderstanding in the world.
> Pull in JIT requires to have Inventory, therefore, it is not possible to be always correct.
> Lean in Pull needs to have the limited condition (which is same condition of kanban system).
> Under the other conditions which are intermittent, unknown,

> non-repeated production, Pull doesn't create lean situation.

Another one of contradiction is negation of sales forecast in spite of the affirmation of Heijunka in this book.

> The base of Heijunka planning is sales forecast.

Note) Thought of Lean.

According to the information of Lean Enterprise Institute the thought of Lean is as follow.

> The core idea is to maximize customer value while minimizing waste. Simply, lean means creating more value for customers with fewer resources.
>
> A lean organization understands customer value and focuses its key processes to continuously increase it. The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste.

I have no disagreement to this thought because it is quite natural thought as business philosophy. And it doesn't need to bother to say because it is too commonplace as the goal of factory management. However the problem is the sentence of "5 Steps" for lean implementation.

If this book had described just the thought and presented TPS, it could have a value as one of TPS presentation book.

But.

Unfortunately this author put it in the book.

He investigated Toyota deeply. However, he didn't altogether investigated all, but was biased.

I think it is one of worst influence of the lean book which seems to deny the necessity of sales forecast and say that

> Based on the Dramatic improvement of LT,
> Gain the capacity of Make-to-Order for customer's Pull in JIT,
> Without the necessity of making sales forecast.

Based on these sentences below is written.

> Let the customer pull products as needed, **eliminating the need for a sales forecast.**

This sentence has given and gives the misunderstanding world widely.

I believe that this sentence doesn't deny the necessity of sales forecast, but teaches the necessity of changing from Make-to-Storage to Make-to-Order with improving LT dramatically. However.

Even so the following sentences are foolish and ludicrous.

> The evolutionary thing is to realise the capacity of Make-to-Order with Scheduling and Designing and Production for customer's Pull in JIT (the timing and the things of customer's wish) without making the sales forecast.
> Then customers can pull their wishes in JIT.

I wrote Pull in the example of SUSHI revolution in "Making stream of production-9".

In the new style SUSHI restaurant, Pull with quick response is mainstream now.

In this style, customers can pull their wish, however, this style also is not complete Pull because the customers have the constraint which the order is limited to just NETAs which the restaurant provided.

NETA; SUSHI is constituted of Rice part and NETA (raw fish or ---).

And in this column I wrote the example of TOFU.

If the supermarket provides the TOFU production line in the store, it is possible to get closer to non-sales forecast.

But of course the line needs to have the processes which are boil soybeans, make soymilk, bittern & coagulation and package.

Then it takes several hours to produce.

On the other hand customers are caprice.

They never wait the short LT to gain TOFU even though less than 30 minutes.

To respond the customer's caprice demand, it is quite reasonable idea to have stock in batch production.

But even if the supermarket provides the TOFU line in his store, how can he do another products such bread, ham, cooked meal etc. which are required certain production LT also the characteristics of short term deterioration.

Does he provide lines of these products or establish his castle town like Toyota?

Industrial castle town also one of good idea of short LT. However.

Even though making castle town, it is more difficult to gain the capacity of "Make-to-Order with Scheduling ~ Designing ~ Production to Customer's Pull in JIT" than gain the witches of Cinderella.

"Scheduling ~ Designing ~ Production" also requires the certain period LT.

And industrial castle town like Toyota city can be established by just great capital and bland like TMC, GM etc.

General industrial company can neither do their manner nor employ witches.

The lean book explains the concept and TPS (as the method of approaching lean).

But an ideal concept which is premised on to employ witches is mere fantasy for us.

By the way this lean book doesn't tell a lie, but tells truth. However.

Tells the truth but a part of truth.

Therefore if general companies which have kanban applicable products and spot and intermittent demand products make the line in the book's manner, they might have tremendous adverse effects.

By the way.

Do you believe that elephant is like a snake. Yes "snake".

It is true. If touching just tail.

In fact I do this story which is an elephant and 3 blind persons.

One person says that an elephant is like snake.

One person says like a wall.

One person says like a pillar.

These like snake, wall, and pillar are true if touching each part (tail, belly and leg).

The lean book tells the truth, but one part of truth.

So.
How Toyota makes his production plan and schedule?
First of all I tell the answer.

> Toyota also uses the sales forecast for his production planning and Heijunka.

As I promised in the last edition, I describe the Toyota production planning.

> ※Firstly let me warn you: this Toyota method is possible to be realised by just grand capital and bland and is no possible by general industrial companies.

Recently Toyota or Nissan improved the production planning system based on IT very much.
For instance Nissan has introduced the new system in his Nissan Brazil (Rio de Janeiro) 2014 April.
For the new plant, Nissan introduced the new system which is based on JBoss BRMS (products of Red Hat).
According to the evaluation of my friend, it might be epochal.

> JBoss; JBoss Enterprise Application Platform
> BRMS; Business Rule Management System.

The key issue is that

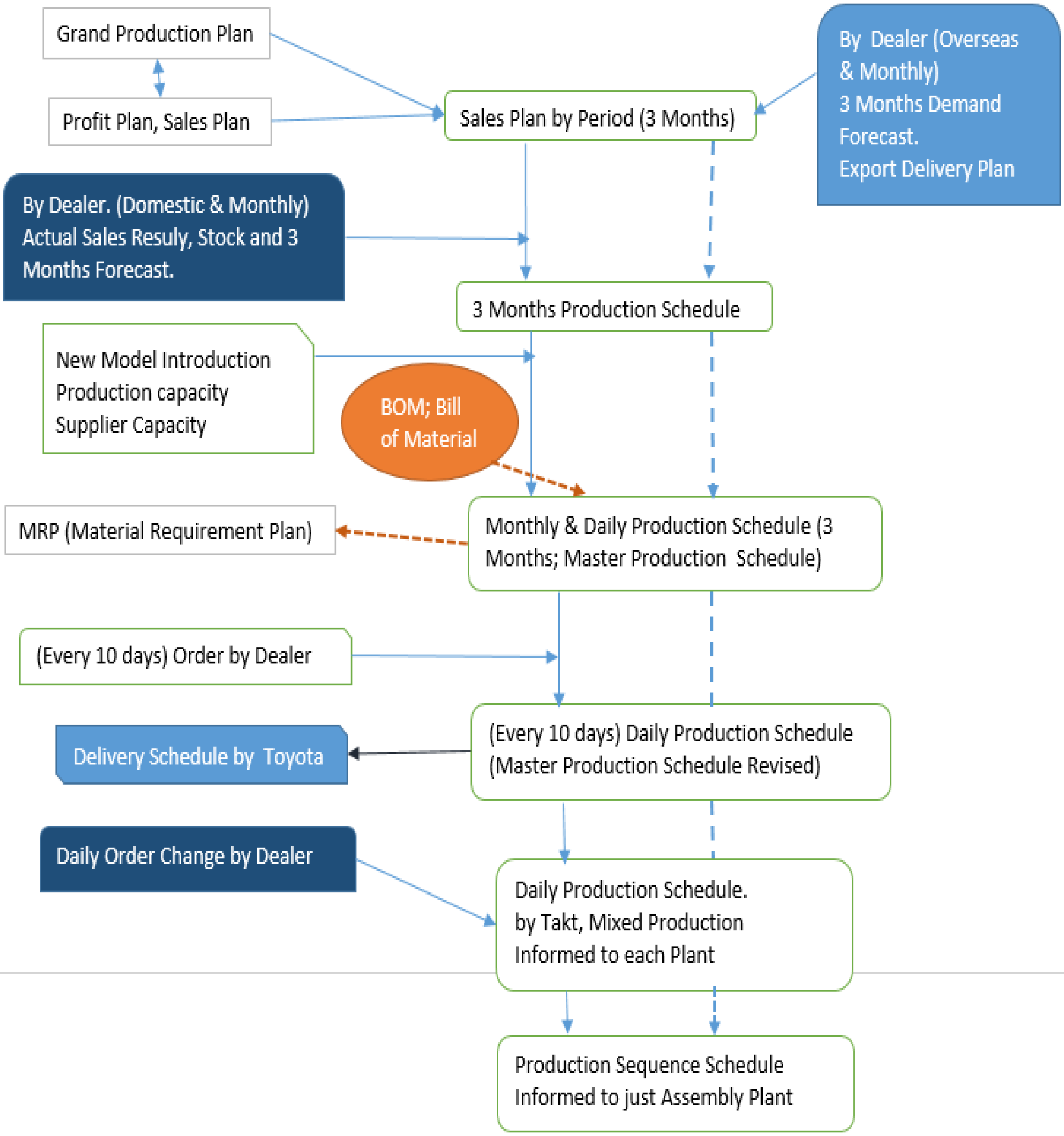
> Cut off the control of business rule (including external environment) from the application.

Anyway they are developing their system daily bases.
And if you have interest, check out this JBoss BRMS.

> Omit the detail explanation, because I'm not the expert of this field.

Again according to the friend, although the system has been improved in IT, the basic system flow hasn't been changed.

The below system flow is the method of Toyota. And Nissan also uses almost same system.
In summary, it is possible to say "Seat Reservation Production Scheduling System".


Grand Production Plan
Profit Plan, Sales Plan
Sales Plan by Period (3 Months)
By Dealer (Overseas & Monthly) 3 Months Demand Forecast. Export Delivery Plan
By Dealer. (Domestic & Monthly) Actual Sales Resuly, Stock and 3 Months Forecast.
3 Months Production Schedule
New Model Introduction Production capacity Supplier Capacity
BOM; Bill of Material
MRP (Material Requirement Plan)
Monthly & Daily Production Schedule (3 Months; Master Production Schedule)
(Every 10 days) Order by Dealer
Delivery Schedule by Toyota
(Every 10 days) Daily Production Schedule (Master Production Schedule Revised)
Daily Order Change by Dealer
Daily Production Schedule. by Takt, Mixed Production Informed to each Plant
Production Sequence Schedule Informed to just Assembly Plant

Now.
I explain each process.
Sales Plan by 3 Months Period (by Sales department).

It is made with the information of Sales Plan (by Sales department of Domestic and Overseas) and Grand Production Plan.

Domestic Sales dep. receives 3 months demand forecast which are by car type, line and large classification each month from dealers.

Overseas Sales dep. also gain the 3 months demand forecast each month from the overseas dealers. This information also has the information of car type and large calcifications.

3 Months Production Schedule (by Production Control department).

The Production Control dep. makes the 3 Months Production Scheduling with these information (Sales Plan by 3 Months Period and Export Delivery Plan; 3 Months Demand Forecast).

Monthly & Daily Production Schedule (Master Production Schedule)

In 3 Months (1st, 2nd and 3rd month), the first month's production schedule is made in production volume Heijunka which the total volume is simply divided by total (1st month's) working days and also by car type and line and large classification.

Large classification; Body type, Engine type (Engine Displacement, Fuel, Hybrid), Transmission and grade.

This Master Production Schedule is so-called "Seat Reservation".

Material Requirement Plan (MRP)

In adding BOM (Bill of Material; Design Data) to the Monthly & Daily Production Schedule, MRP is made.

Then this MRP information which is calculated the necessary materials and parts is given to each processes of the car maker and his suppliers.

My previous company also gets this 3 months material & parts requirement forecast (Pre-information of material requirement list).

Of course this is just pre-information and not the order. And daily order is made by kanban.

(Every 10 days) Daily Production Schedule (Master Production Schedule Revised)

Production Control dep. receives the (Every 10 days) Order from Dealer.

※The number of (Every 10 days) Order which should be within the dealing frame which is determined in the 3 Months Production Schedule. Also the (Every 10 days) Order identifies the final specification.

This (Every 10 days) Order is informed before 7 ~ 8 days of line-off.

(Line-off means that the assembly of the car ordered by a client is finished and left from the line.)

Production Control dep. makes this (Every 10 days) Daily Production Schedule which is scheduled daily production volume by line and is so called Master Production Schedule Revised.

In parallel the department reports the Delivery Schedule before 1 week of line-off.

Daily Production Schedule.

The Production Control dep. receives the "Daily Order Change" from the dealers before 4 to 5 days from the line-off.

※Daily Order Change is the real customer's order. And when a dealer gets an order, and if he has the car in his inventory, he can deliver at same day. But if he hasn't the car (Colour, Engine, Fuel, Grade---), he needs to make the Daily Order Change.

※And the volume of Daily Change Order must be within 10%.

Nissan allows larger range of Daily Change Order which is sometimes more than 30%. However Toyota and Nissan, both of them use this "Seat Reservation Production Scheduling System" which provides the production reservation in the Monthly & Daily Production Schedule and after getting real order, applying the order to the production reservation.

This Daily Production Schedule is given to each factory before 3 days of line-off.

Production Sequence Schedule.

Continuously the Production Control dep. makes and informs the Production Sequence Schedule which is considered mixed production and takt time in Heijunka production.

And this information is given just final assembly. Other plants are pulled by kanban.

The parts suppliers such my previous company SUMITOMO provides the production capacity in the 3 Months Forecast and getting the Production Order kanban which is from the Sumitomo distribution centre.

And necessary wiring harnesses are pulled with Withdrawal kanban between the Sumitomo distribution centre and Toyota line side.

This Production Sequence Schedule is given to the final assembly line 1.5 days before the car (which is ordered 3 ~ 4 days before) line-off.

Now and again kanban calculation.

Do you remember the formula of kanban number calculation which I described in the Making stream of production-13?

Number of kanban card = (Nnp + Safety Stock) ÷ Quantity of one container.

Nnp = LT of Pk x Average quantity of use/hour (pull of next process)

Nnp; Necessary number of parts (or materials).

Pk; Process kanban (Production Order kanban).

The Safety Stock = Nnp x Safety coefficient. Then.

Number of kanban = [Nnp x (1 + Safety coefficient)] ÷ Quantity of container.

And I described as follow.

"The range of the fluctuation (production difference) should be less than 10%. Yes, 10%."

In Toyota production system or another words, the rational method to reduce Muda is to minimize production fluctuation.

So as you understand that 10% of fluctuation in kanban system of Toyota is not the natural condition, **but is made in above production scheduling flow**.

By the way

What is core technique of TPS?

When making this question to 10 Toyota persons, 8 to 9 persons in 10 say that it is Heijunka.

I also believe that the most principal technique is (not for instance kanban etc., but) Heijunka. Therefore I don't recognize as the company TPS implemented, if he doesn't use Heijunka production planning.

And Heijunka is based on the Sales Forecast.

In my experience I can say that the companies Heijunka implemented is better performance than the companies not implemented it even though the accuracy of Sales Forecast is still poor.
As I described the importance of sales forecast with the example of TOFU production, I recommend to make effort to improve the accuracy of it.

> It is quite true to seek absolute accuracy of sales forecast is not possible because we cannot employ witches. But it is important to pursue its accuracy.

The lean book gave quite big influence in the world and gives bad influence same as good influence.
The root cause of bad influence is that sentence of "Pull--- eliminating sales forecast--" (which is core concept of this book).
And please understand Sales Forecast must be never denied in a business.

Going back to the kanban issue.
In the previous edition I described the outline of the kanban system. And continuously I would write a little more.
-1. Number of kanban card in the case of common parts.
I used the case of one famous machine-tools maker. He produces product A, B, C and D which are constituted of 300~400 parts including around 40 in-house parts.
And in the 300~400 parts, there are many common parts.

Prod. No.	Parts total	Common for all	Common in A,B	Common in C,D	Common in B,D	Unique
A	320	220	30			70
B	380	220	30		20	110
C	400	220		40		140
D	390	220		40	20	110
Total	1,490	880	60	80	40	430

In this case how many kinds of kanban cards are provided?
If all parts are unique for individual product, 1,490 kinds of kanban should be provided. However, these products have many common parts as above matrix and it is no necessary to prepare the kanbans of 1,490 kinds.
The result of kanban kinds in MRP calculation is

> 220 + 30 + 40 + 20 + 430 = 740 kinds.

Normally for the calculation of Number of kanban (in considering Common and Unique), MRP in computer is used.

> MRP = BOM (Bill of Material) x Production Schedule.

Currently it became very convenient because it is possible to calculate in computer.
When we made the huge trial of kanban introduction with the group of Suzumura, there was no convenient computer system. And we calculated the BOM (Bill of Material) by manual.
And the frequent design change occurred (and occurs) daily. Yes one of failure cause was the busy office work and the accuracy in not only the design change occurrence but also so many kanban kinds which must be maintained.
-2. Kanban Ledger.

To implement kanban system certain clerical works are necessary which are the maintenance of Kanban Ledger and issue & abolition of kanban.
The kanban ledger is required the clerical work system which is implemented in computer, however, the principal leading role is person.
Kanban Ledger (in computer) is as follow.

			Kanban Ledge				
Part No.	Part Name	Factory & Line	Machine	Address	To	Address	Supplier line
1234-5678	Supporter	Press P-2	Press Machine	P-8-34	Galvanization	Galv-4-23	in House
Issue Date	I. C. A	No. of kanban	Container	Quant.	Safety Stock	LT (Hours)	Note
15'.apr.25	Ⓘ	7	B Container	5	5	8	
15'.apr.30	Ⓣ	8	-----	-----	-----	-----	For Overtime Work
15'.apr.31	RⓉ	7	-----	-----	-----	-----	Finish and Remove
15'.jul.02	Ⓒ	7	-----	-----	-----	-----	Design Change No. 987
15'.aug.14	ⓘ	10	-----	-----	-----	-----	Demand increased, 100 to 130
15'.aug.20	ⓚ	8	-----	-----	-----	7	LT reduced in kaizen 8h to 7
15'.sep.15	Ⓐ	Collect All					Complete Design Change No. 988
	Ⓘ	ction End kanban: 13		5 x 2 + 3			Inventory Check. Collection of
							all 8 kanbans and issue 1 kanban
	Note)	Ⓘ; New issue. Ⓣ; Temporary. RⓉ; Remove Temporary kanban. Ⓒ; Design Change but after complete					
		of use. Ⓘ; Production demand increase. Ⓚ; kaizen implemented and reduction of number of kanban.					
		Ⓐ; Abolition because of production end. ----; same.					

In BOM it is necessary to have following information.

Product. No: 1234-567		**Bill of Material**		Issue Date: 2016.07.22	
Product. Name: 32100-345-1311-C-⑤					
No.	Part Name	Part Number	Quantity	C or U	Note
1	AAAAAAAA	1356-2309	8	C	
2	BBBBBBBBB	1356-9806	5	C	
3	CCCCCCCCC	2248-4526	2	C	
4	KKKKKKKKK	1328-2354	1	U	
5	EEEEEEEEEE	2138-8753	3	U	
6	FFFFFFFFFF	3890-7845	1	U	
7					
8					
9					
	Note) C: Common parts. U: Unique parts.				

Note) ISO 9000.

In ISO 9000, there is the essential item which is the standardization of Document Control. One of characteristics of ISO 9000 is to be required the capacity of the document control.
Even though no having ISO 9000, same capacity level of document control is necessary for kanban control.
For document control and for keeping kanban, following standards are necessary.

Document Control Rule (Issue, Keeping, Change, Abolition).
Design Standard (Control of Design, Design Change, Customer's Drawing, Drawing for Cost, Drawing for Production, BoM)
Parts and Material Standard (Drawing & Part Number, Raw Material)
Production Standard.
Machine & Equipment Standard (Capacity Table)
Working Standard.
Quality Standard (Quality, Evaluation of Process, Supplier)

Then if you have not the certification of ISO 9000 which requires the very heavy document control or same level document control capacity, you may not possible to maintain kanban system.
(Engineering Control Capacity.)

Note) The introduction failure case.
I have seen and heard the cases of kanban introduction failure.
(And I also had the failure experience.)
Why? And what is the causes of introduction or usage failure.
Conversely we can succeed to introduce kanban and stabilize it in considering next matters.

1) Characteristics of products and choice of kanban.
Normal kanban (Withdrawal kanban and Production Order kanban) is for just
  -Continuous production (no monthly intermittent) and
  -Certain term lifecycle,
  (Small demand is not the problem, if it is continuous and certain lifecycle.)

2) Other important kanban is used appropriately.
  Other kanbans: Temporary kanban, Express kanban, Through (or Tunnel) kanban, Common use kanban,
  Production End kanban, Make to Order kanban.

3) Push system also is used appropriately.
  -Intermittent demand products,
  -Seasonal products (peak in short period),
  -Short life cycle,
  -Make-to-Order product,
  -New products introduction which are expected high volume in start.
  -Ending products,
  In such cases, push system with (One cycle kanban) Make-to-Order, Production End, and Temporary kanban is reasonable and the replenishment pull system is not reasonable.

4) Establishment of mixed kanban production system.
  Pull kanban and push (in Te-ban Control and One cycle kanban) must be used in same factory.
  (Of-course it is possible and must be.)
  Such production control system with simple visual control board is required to establish.

(How? I describe it near future.)

5) Not so many kinds of kanban.

Long and many processes require many kanban and middle stock spaces in each process.
The difficult process is not assembly which is possible to be "one piece flow", but parts preparation which are necessary to keep many processes and batch production.
If there are many kinds of parts, One Cycle Kanban is better than normal kanban. (Even though these are continuous demand.)
SUMITOMO produces wiring harness.
And the wiring harness of the car is constituted of many kinds of electric circuits (many kinds of parts).
These electric circuits are produced in one cycle kanban (in Te-Ban control) even now.

6) Cultivate the capacity of Engineering Control.

Document control, Drawing control and Change & Abolition.
Etc. etc.

7) Visual Control in 5Ss.

Lost kanban, hidden kanban and broken are big enemy to keep system.

8) Cultivate the mind of "All people participation".

Because kanbans are handled by workers. Cultivating the minds of kaizen, multi-skill worker, keeping standard, Quality and Cost.

Note) I think there is an obligation to the No. 5) Not so many kinds of kanban.
However you can understand that many processes needs to have many replenishment pull stock area for individual kanban. And the replenishment pull stock area is (most of the case) fixed and not flexible.
Also many kinds of kanban are required.

Location of Replenishment Pull = Σ Parts kinds x Processes.
Number of Kanban = Σ Parts kinds x Number of each kanban issued.

Maintenance of kanban is required monthly and daily when the condition is changed (sales forecast, kaizen implemented, design changed, production end, finished kanban & abolition, new kanban issue).
And this maintenance is very troublesome. It is indeed very much troublesome.

Again I say that Kanban system is very useful means for controlling process and as the tool of kaizen if you use correctly in correct understanding.

I also present Bad Kanban cycle which I have seen.
1) Fluctuation of kanban pull.
2) Causes a shortages of the parts or materials.
3) Increase of the number of kanban.
4) Increase of stock (WIP or Inventory) level.
5) Missing the sense of tension in the genba. Lost kaizen point.
6) Lost of kaizen mind and needs.
7) Back to 1).
Now I wrote firstly, I leave from TPS in Making stream of production a little while.

And from next, I write Factory Management.
Before finishing this column, I would respond to some interesting questions.

Question and answer-1.
Are TPS and Lean same?
Frequently I got this question because I always say that these are different.
My answer is that TPS (Toyota Production System) and Lean are different.
Probably my thought is minor, but true.
For your reference I present one true story.
True story (my bitter memory).
I have got a consulting requirement from a company with through my friend.
(But as a result my suggestion and action plan were declined by this client. Anyway the cause is as follow)
Recently this company introduced Lean manufacturing system.

Note) Lean manufacturing system? What is this?
For me this word is very much ambiguous. However.
According to the talk of this company, he seemed to point at TPS.
There is no so called Lean manufacturing "system", but is a thought.

This company (he) introduced the kanban system with the help of a lean consultant.
After the investigation of the processes, a project was established.
The purpose or target is just for introducing kanban. And with through the use of kanban they intended to develop the company.
And after the deep education & study, the project succeeded to introduce one model line of kanban system (just normal kanban). This model line seemed to be very well.
Then
The knowledge and the experience of the kanban system (normal kanban) was spread to all factories.
But soon many problems which weren't appeared at the model line were occurred.
The problems were

Increase of WIP and Inventory and the index of Inventory Turnover deteriorated.
Increase of Scrap losses. (Loss of Scrap & Repair).
Increase of hidden obsolescence of finished goods, raw material and parts.
Line stop occurrence increased due to the problems of issuance and maintenance of kanban.

And the top managements thought that it was something wrong.
It was very clear for them that the WIP and Inventory had increased after kanban.
Why? Why had the financial indexes deteriorated under kanban?
Then they made the verification regarding relevant factory KPIs.
When I was invited by the top managements, I saw very unique kanban which was circulated between the production line and special storage area which kept many design changed finished goods and WIP.
The control of this special storage area was well computerized. And when getting new demand, firstly the material requirement applied from this dead-stock of finished goods & WIP.

And the necessary products were re-made from these.
The financial director who had the prejudice to kanban system as lean manufacturing system said with a sneer and with irony.

He said.
"Kimura sensei. After the kanban most beneficial line is this storage area."
And we call this MRT.
Don't misunderstand MRT is not the meaning of Mas Rapid Transit, but Material Reutilize Team.

Depending upon the process and WIP, it was possible to reuse as a raw material.
But. Finished goods of obsolete design were almost scrapped.
Recently and after the kanban implementation, a financial index deteriorated because of the deteriorated Inventory Turnover and new investment for prototype & trial manufacture factory.
(This requirement of prototype & trial manufacturing factory was exist from long day before.)
And to separate the prototype & trial manufacture and very small lot demands and intermittent demands from kanban production, it was re-planned and established.
This factory also required to have some production facilities.
Previously these prototype & test manufactures and also small lot, intermittent demands were made in the production factory. But now these were separated.

He said.
Total efficiency? Total performance?
Of course these were deteriorated.
I say that it is something wrong and one of root cause is kanban and also the kanban system was failed.

Note) Why was kanban failed?

Most of the products and demands were not suitable for (normal kanban) for this company.
Major products have "Long lifecycle but short design lifecycle".
Intermittent demands.
And the products which were suitable to apply normal kanban were 15% production volume in total. (Even though 40% of sales amount in total.)

After my verification I told to the top managements.

-Lean is not always "pull". Pull is not always lean.
-Lean and true TPS are different.
-Kanban (normal kanban) has its strengths and weaknesses.
-(Normal) Kanban is not suitable for most of your products (demands).
-Abolition of special storage area and the kanban after certain period.
    (To reduce the workload of design engineers who were required to make additional job of making instruction sheet for re-usage.)
-Abolition of test manufacture factory (quite new factory). And sell the excess facilities.
-Production Heijunka implementation in sales forecast.

Note) Again Heijunka.

Heijunka has 2 kinds. One is Production Volume Heijunka. Another is Production Kinds Heijunka.
Sometimes I see the word of Heijunka which just explain Production Volume Heijunka.
Heijunka in TPS is required both of Production Volume and Production Kinds Heijunka.
To pursue small batch production (for instance) in machine area, implementation of just Production Volume Heijunka is not enough and of Production Kinds Heijunka is necessary to minimize the wave of usage.
Unfortunately this company didn't implement any Heijunka.
No Heijunka in kanban? It is same to the salads of no dressing.
(Possible to eat but tasteless.)

And I presented and recommended my action plan.

-Supplement of basic factory management.
    (The company scored 58% in the Factory Management Checklist)
-Introduction of special kanbans (One cycle kanban) in Te-ban control with push.
-Improvement of computer system.
    From product design, sales forecast, MRP to gemba kaizen result.
    Increase of kanban maintenance capacity.

Conflict.
(I was informed the situation of the conflict in the grand meeting. And my reputation was horrible. I reproduce the scene of the grand meeting based on the talk of my friend as follow.)
There were the conflict between the groups of financial director and the followers of Lean.
Financial group claimed to discontinue with kanban.
And lean followers claimed to continue with kanban and SMED and LT improvement.
And my suggestion gave the result to add fuel to the flame.
The lean followers told.

Pull is not always lean? True TPS? Lean and TPS different? Sales forecast?
The consultant doesn't know Lean and he is a fake!

3 weeks later once again I was invited to the company and was declined my consulting job.
I listened my reputation which I was evaluated to be "fake and ignorance of lean".
It was indeed ridiculous.
After a while I was informed by the friend that the company abolished kanban.
Foolish. Again it was indeed foolish.

It wasn't necessary to abolish all kanban.
I just suggested to have
    -Additional kanban system (with Te-ban),
        Push kanban (One cycle kanban): Production End kanban, Make-to-Order kanban, Temporal kanban, Express kanban, Prototype kanban.
    -Heijunka and Sales forecast,

- -Lot to Lot store,
- -Kanban Shikake board; Kanban control board (for push kanban)
- -Mixed production (for mixing normal kanban products and push kanban in one factory and line)
- -Group production in different takt cellular.
- -Sub-line system.
- -Multi Skill operator diagram,
- -Nagara work in Multi-skill,
- -Andon (for production delay and help),
- -Standardization.
  - Working Standard, Standardized Work Chart,
  - Standardized Work Combination Table,
  - Job Instruction Sheet and Process Capability Table.

- -Machine process improvement in Chaku-Chaku.
- -Teiichi-Teishi system.

Anyway. The degree of the system completion was under than still middle.
With many trouble and investment, the company introduced kanban, but abolished it.
It is foolish and very sorry. He didn't need to abolish the normal kanban which was suitable for the continuous manufacturing.
And he was just required the methods to apply to the other products which were trial, prototype, small and intermittent demand and production end.
After a while I got an invitation letter from the financial director who desired me to visit again, however, I was busy for my other clients.
Then unfortunately I declined his proposal.

Once again let's pick up the causes of kanban failure.

- -They insisted the thought which lean is "pull" and denying Heijunka in forecast.
  - To seek lean managerial situation both of pull and push should be used on a case-by-case basis.
- -They believed lean equal TPS.
  - TPS is one of good means of lean management, but has its strengths and weaknesses.
  - And TPS never deny push in special kanban (push kanban: one cycle).
- -Kaizen mind of certain level in factory management wasn't formalized.
- -Computing system for kanban control was still poor.
  - (Maintenance; Issuance, abolition, increase or reduce, monthly and daily calculation)
- -There was no series of Sales forecast ~ Production schedule ~ Heijunka.

Another one of unhappy was that most of the members of the project moved to other companies or stood on their own feet as consultants after kanban experience in the model line.
The causes of these problems which didn't appear at the stage of model line were

Application of the normal kanban (Production Order kanban and Withdrawal kanban) to all products which include unknown demand and intermittent demand.

Now
What is the causes such misunderstanding (Lean is "Pull" and equal TPS)
Is such misunderstanding rare case?
It is not possible to say definitely that it is rare and special case in the foreign countries.
Not so little persons who know the word of Lean or TPS believe that Toyota hasn't the production planning and sales forecast because of the replenishment pull system and kanban. And when I explain the truth, they uniformly are surprised.
The cause of worldwide misunderstanding is the lean book.
This lean book is one of TPS presentation books.
As I wrote before, this book gave big influence (good and bad) in the world.
This lean book presents the case studies of TPS introduction companies. In the prologue of this book, the authors described that Lean production equal TPS.
At least they described and intended this book to present TPS as one and only tool of Lean manufacturing. However, unfortunately they didn't describe total picture of TPS and defined that "Elephant (TPS) is like Snake (Pull). And this book denied Heijunka.

Actually there is the description of Heijunka in the book. But on the other hand (looks like) denies Sales Forecast which is the base of Heijunka.

As a Japanese TPS practitioner this book is incoherent.
Lean is just one of thought which itself hasn't any system to realize it.
TPS is one of system to realize Lean (, but not the one and only way).
The important thing is to have the knowledges of many techniques and choose proper method according to the condition of your company.
How is the situation in Japan?
I don't know exactly but I believe that the disciples of Lean is quite rare.
Basically "Lean" is now obsolete word in Japan.
Rare disciples and obsolete word?
For your reference I present a letter which I have mailed to my Spanish friend Mr. XXX.
Good morning XXX.
Now I'm considering how I can tell for your reference.
Then I tell following 4 comments.
-1. I don't (and didn't) have any influencers of lean.
-2. Lean and TPS are different.
-3. In Japan the word of "Lean" is dead word or obsolete word.
-4. I like TPS but am not the zealot (blind belief).
Now one by one.
-1. I don't (and didn't) have any influencers of lean.
It is true that I have (and had) no any influencers regarding Lean.
It is quite true.
Again

If I dare to say the lean influencer, it is Sumitomo Electric which is the mother company of my previous company Sumitomo Wiring Systems.

At the 1970s I was despatched to Sumitomo Electric to learn the production management including Industrial Engineering.

At that era there was the word which is "Slim Management" in Sumitomo.

The concept of "Slim Management" was

Slim organization (no fat in the organization).
Stock less (Minimized WIP and Inventory).
The concept of CS, SS, ES.
Etc.

And this concept is very similar to Lean.

For achieving the slim management concept, I have learned the basic factory management.

At this era (I don't remember which was first) I also joined to the project team of TPS introduction and got the teaching of K. Suzumura who was the evangelist of TPS.

Also at same era, I got the lectures of T. Ohno, K. Ishikawa and S. Shingo etc.

Their teaching were marvellous, however and just because, T. Ohno is not my influencer of lean.

His theory was and is just one of them of lean factory management.

-2. Lean and TPS are different.

TPS and Lean (which Prof. J.P Womack wrote) are different.

Lean is just a concept based on JIT.

And TPS is one of means to realize lean.

-3. In Japan the word of "Lean" is dead word or obsolete word.

In Japan

The word of "Lean" is dead language or obsolete word.

In Japan the largest bookshop is Maruzen. And even one of branch shop in my city has more than 4.5 million books (without magazine).

> Note) My judgement of Lean is obsolete word.
> I hadn't made the survey particularly to know the situation of lean word.
> But I believe that it is fair to judge it based on the sales of books particularly the record of number of print.

And I can buy almost of my favourites any time.

But I couldn't gain his book "Lean Thinking" which is the origin of lean expansion in the world.

There was the book name in the computer (Maruzen also has the computer system of searching and ordering book.)

I tried to make order this book, however, this book had been out of print after the first print at 2003.

I got this book in a second hand bookseller with 2 dollars.

I judge a book to be popular or not in the number of times of print. For instance Toyota Production System of T. Ohno counts the number of print 128 times so far.
But Lean Thinking was disappeared after only first print.
Now in the computer there are many names of lean, lean,---.
But all are out of print.
And there is no book which is named Lean--- in any large bookseller.
This is the reason of my saying Lean to be not popular in Japan.
Your saying Lean is the meaning of TPS, isn't it?
I wrote in the last letter that I read good and bad and non-valuable books.
One of non-valuable book is this Lean Thinking.
This book is mere TPS presentation book and in Japan there is no value.

> Note) In Japan more than 10 new books which are named Toyota---are published every year. For instance Process Kaizen of Toyota, Katazuke of T, Human Resources Cultivation of T -----.
> And almost disappear in just one print.
> As a Japanese, Lean Thinking is mere one of them.

Also this book scattered the bad influence which is the misunderstanding of Lean is TPS.
TPS and Lean are different.
The book, Lean Thinking is written based on TPS and also emphasizing "Pull system".
TPS is useful means for car manufacturing like production, but never multi-purpose means. And "Pull system also never suitable means for other cases (which are not like car manufacturing production).
-4. I like TPS but am not the zealot (blind belief).
Again TPS is simply one of means.
And if the process of customer is like car manufacturing, I recommend and teach this.
Now I'm writing Making Stream of Production-13.
And in this I describe the use of kanban system.
Kanban system is very good means for car manufacturing like process which essential conditions are

1) Continuous demand.
2) Certain demand forecast.
3) Possibility of making Heijunka.

I have written in the Making stream of production-10 that if the process or product have not above condition, pull system (which requires to have stock) has the fear of increasing WIP and Inventory.
XXX.
What is your saying Lean?
You expected me to introduce good lean book like Lean Thinking, didn't you?

Very sorry but I don't know good lean book because at this time there is no lean book in Japan (Already disappeared).
Again I have no influencers of lean.

Koichi Kimura
Above is the contents of my letter to the Spanish friend.
But I added the description of Note) at this time.
The concept of Lean.
I never say that "Lean thought" is wrong or meaningless.
Conversely I like the sound of lean which is better than Slim Management.
But I cannot accept the 5 step for realizing it.
I cannot accept that this book insists that TPS is one and only way to realize lean.
TPS which is from Sales Forecast ~ Seat Reservation Production Planning ~ Heijunka Production Planning ~ Kanban ~ --- is peculiar system.
The lean book was written in the part of "Pull" in TPS.
But TPS has both Pull and Push also doesn't deny the Sales Forecast.
This misunderstanding (of the authors of the lean book) causes worldwide misunderstanding and failures.
TPS and Lean are not same.
TPS is one of means to realize lean management.
For realizing lean management, TPS is not one and only way. You need to choose suitable means according to your company's condition.
You need to know the characteristics of the methods correctly and choose and use them correctly.
Finely
I would recommend

> You leave from Lean and TPS once time if you like to pursue lean management.

Question and answer-2.
Again LT.
Process LT and Material LT.
From my disciple one of doubt was raised regarding LT. His saying was.

> In any lean or TPS book, there is no description of 2 types of LT.
> Why do you define 2 types of LT?
> The cause of bad material LT is the long LT of process LT, isn't it?
> Therefore LT is just process LT, isn't it?

First of all I say that LT should not be defined as a line but as a surface. And.
Process LT is the warp and Material LT is the weft.
What is the purpose of factory management? The purpose is to improve or maintain

> Throughput, Cash-Flow (and CS, SS, ES) with through the utilization of Managerial resources.

And LT is essential factor for Throughput and Cash-Flow.

Now.

For this question raised, I describe as follow.

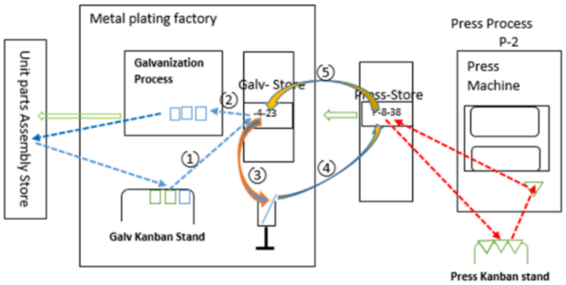
In the Making stream of production-12, I wrote that we need to consider the 2 types of Lead Time which are Process LT and Material LT.

As I have written, LT (Lead Time) has 2 phases.

One is Process LT. And another one is Material LT.

And when kanban system (in pull system) is implemented, the Material LT is always longer and worse.

Please imagine following process (which is in the Making stream of production-13.)



When the pull system is implemented (in kanban system) the material LT of Galv-Store deteriorates than the Make-to-Order production.

In the case of Pull, the production start or production order information comes from the downstream and is the replenishment pull production for just the parts pulled.

Therefore the parts which are not pulled are remained and stagnate in the Store.

However. Generally the number of kinds of the parts pulled in one day is by far fewer than the total number of parts kinds.

And the numbers of kinds of the parts in stagnation are by far the many than the kinds pulled.

In other word, when the kanban in pull is implemented, the material stagnation occurs and the Material LT becomes worse.

I know that my proposal of "2 phases" of LT is quite unique.

The definition of LT.

In the first place, LT (Lead Time) is one of Japanese English like as JIT (Just in time) made by Toyota. (According to Wikipedia)

And the definition of LT (Process LT) is

> The taking time (number of days) of processes which are from planning ~ making order ~ production ~ delivery.
>
> And the processes of LT are different depending upon the business type.
>
> And the taking time is not only the net time, but also included the waiting to start, waiting & stagnating, inspection and handling & transportation.

By the way.

What is a concern matter in business?

I can say that concern matters in business are Throughput and Cash-Flow.

And the biggest cause of Cash-Flow deterioration in manufacturing is Inventory.
Therefore it is necessary to control inventory (including WIP) in proper index which is Inventory Turnover.
And controlling this Inventory Turnover, it is important to look the move of material flow.
Material LT.
I believe it is quite important concept. And the definition is

> The taking time from purchasing (Pay money) ~ Stagnation ~ Processing ~ Stagnation ~ Production completion ~ Delivery (Change to money).

- Material LT is a cause and Inventory Turnover is the result.
- Material LT is the results of Process LT.
- Process LT is not the one and only cause of the result of Material LT,
- But mere "one of cause".

And Material LT has another big cause which is the business system its self.
More exactly.
Is it possible to improve Material LT in just Process LT?
No, it is not sufficient.

> One assumption.
> A company of tool maker.
> Very excellent Process LT in SMED
> And very small batch production in machine factory.
> Complete pull with Replenishment Pull system for all products.
> Many designs which include obsolete designs (but unknown).

He provided all tool products in the demands of one year results in the warehouse to response to the customers demands.
And he provided WIP of all tool products in individual process in very quick Process LT for the replenishment pull. However.
As the result the Cash-Flow and Inventory turnover were worse even though good Process LT.
Why?
Because the Material LT deteriorated very much.
Why did the Material LT deteriorate?
This company's products are typical High-mix low-volume production. And he produced these in house (no decentralized production) with kanban system.
His products haven't so many processes, however, need to have many kinds of WIP and their locations.
Then these WIP stagnated in the factory.
Again. In the conditions below

> High-mix low-volume production and
> (Demand unknown and fluctuated)
> Just in house (Decentralized) production

Kanban system is not suitable.
He abandoned the kanban system and reinstated the original production control system which was the mixed production system of Make-to-Order and Make-to-Stock (which had some business opportunity losses).

This case shows the limit to resolve the Material LT with Process LT in High-mix low-volume production.
Again Process LT is one of solution for the improvement of Material LT.
But Material LT is also caused by the type of business.

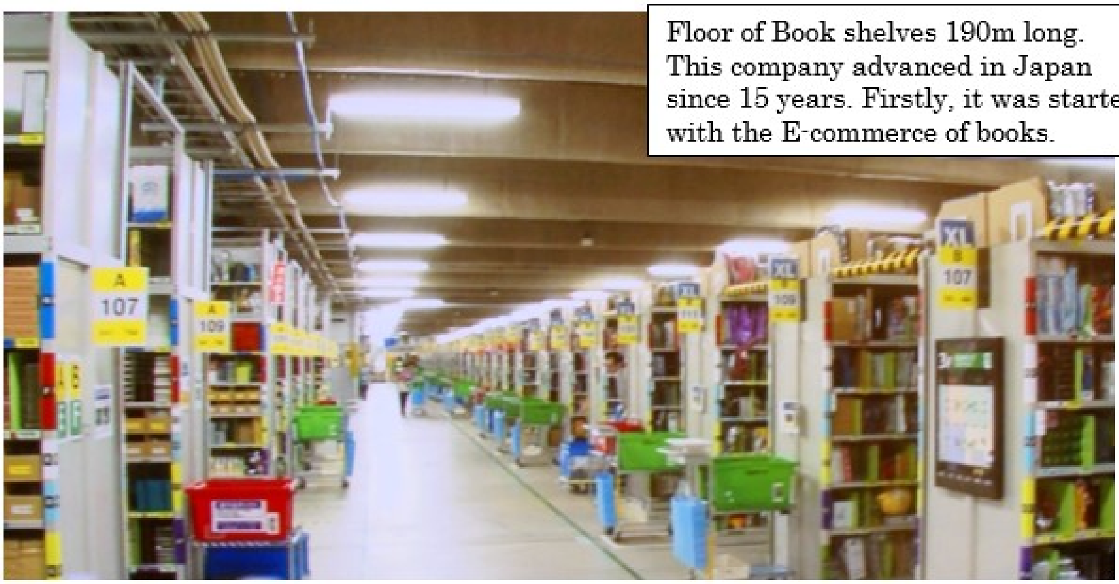
By the way.
There is an unique company which I watch.
The company is Amazon.com.
Firstly this company started the book distribution in web service.
And at the moment, the dealing goods are extended not only books but also Foods, Toys and Convenience goods. Then the number of kinds of dealing goods are more than 100 million items.

Chiba Pref. Ichikawa Distribution Centre.

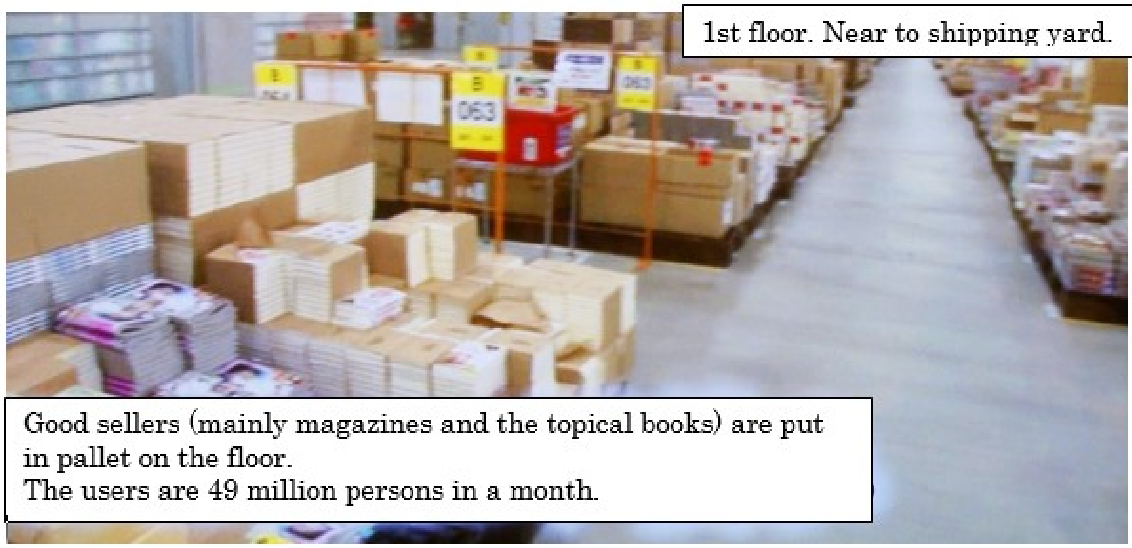
The distribution centre has 5-storey and the floor space of 200 thousands ㎡.

5th floor: Books and DVD & CD. 4th and 3rd floors: Foods, Convenient goods, Electric appliances, Toys. 2nd floor: Company cafeteria. 1st floor: Distribution centre.
The sales point is the "delivery in the day". Very quick LT.

One of sales point is the quick delivery of "Delivery in the same day". The delivery preparation is the speed of 15 items per minute. Recently the trial of "delivery with drone" enlivened the news.



Floor of Book shelves 190m long.
This company advanced in Japan since 15 years. Firstly, it was started with the E-commerce of books.



1st floor. Near to shipping yard.

Good sellers (mainly magazines and the topical books) are put in pallet on the floor.
The users are 49 million persons in a month.

Very unique. This distribution centre has the safety training centre. One of safety rule is "never run". The workers are trained the speed of walk also.

As I wrote above, this company started the business in Japan with E-commerce book sales and very rapidly grew.
What is his target?
Does he target to become a general department store with quick delivery?
Does he intend to apply JIT to the customers?
Anyway this company is very interesting.
By the way. LT.
This company pursues short Process LT in purchasing and delivery.
How about the Material LT?
He is still expanding his dealing goods. And now the dealing goods count more than 100 million kinds.
Probably the Material LT is worse.
But this is also one kind of business type.

Question and answer-3.
The question of my friend is "mission statement".
Why is a company's mission statement (Corporate creed, motto) necessary?
According to his talk, the companies (in US) who have their mission statement are very much rare and haven't it.
I don't think so and believe a company has his mission statement which stipulates the corporate & management philosophy in concise & short sentences.
And he asked me the situation of Japan.
As a matter of fact, (I believe) most of the companies have their certain mission statement. However.
I think Japanese mission statement and US mission statement are a little different.
The next is the explanation of mission statement from (English) Wikipedia and saying.

A **mission statement** is a statement which is used as a way of communicating the purpose of the organization. Although most of the time it will remain the same for a long period of time, it is not uncommon for organizations to update their mission statement and generally happens when an organization evolves. Mission statements are normally short and simple statements which outline what the organization's purpose is and are related to the specific sector an organization operates in.

Properly crafted mission statements (1) serve as filters to separate what is important from what is not, (2) clearly state which markets will be served and how, and (3) communicate a sense of intended direction to the entire organization. A mission is different from a vision in that the former is the cause and the latter is the effect; a mission is something to be accomplished whereas a vision is something to be pursued for that accomplishment. Also called company mission, corporate mission, or corporate purpose.[1]

The mission statement should guide the actions of the organization, spell out its overall goal, provide a path, and guide decision-making. It provides "the framework or context within which the company's strategies are formulated." It is like a goal for what the company wants to do for the world.[2]

According to Dr. Christopher Bart,[3] the commercial mission statement consists of three essential components:

1) Key market: Who is your target client or customer (generalize if needed)?
2) Contribution: What product or service do you provide to that client?
3) Distinction: What makes your product or service unique, so that the client would choose you?

(Above from English Wikipedia.)
I don't give my confidence altogether to Wikipedia, however, I think it shows the tendency of European's and US's general thought.
In Japan the word of mission statement is described as
Corporate philosophy, Management philosophy, Company creed and Company motto.
(※Corporate philosophy and Management philosophy are different in the strict sense of the word.)
The contents of "Japanese Mission Statement" are
The short and concise sentences which summarize the "Meaning to exist (Raison d'etre) of the company and organization and are the spiritual pillar of the company and employees. And it is possible to say that the mission statement is the company's spiritual figure and the base of corporate culture as the corporate ethics.
And it should be in universal.
And the contents are
1) The company's "Meaning to exist (Raison d'etre)" and mission.
Related to the employees, clients and society.

Giving the importance to 3Ss which are Customer's Satisfaction, Employee's Satisfaction and Society's Satisfaction.

2) The sense of value of the organization and employees.

3) Mission statement (Corporate philosophy) is accompanied by the Management philosophy which shows the "Behavioural guidelines" and basic managerial stance and way & methods to realize the corporate philosophy.

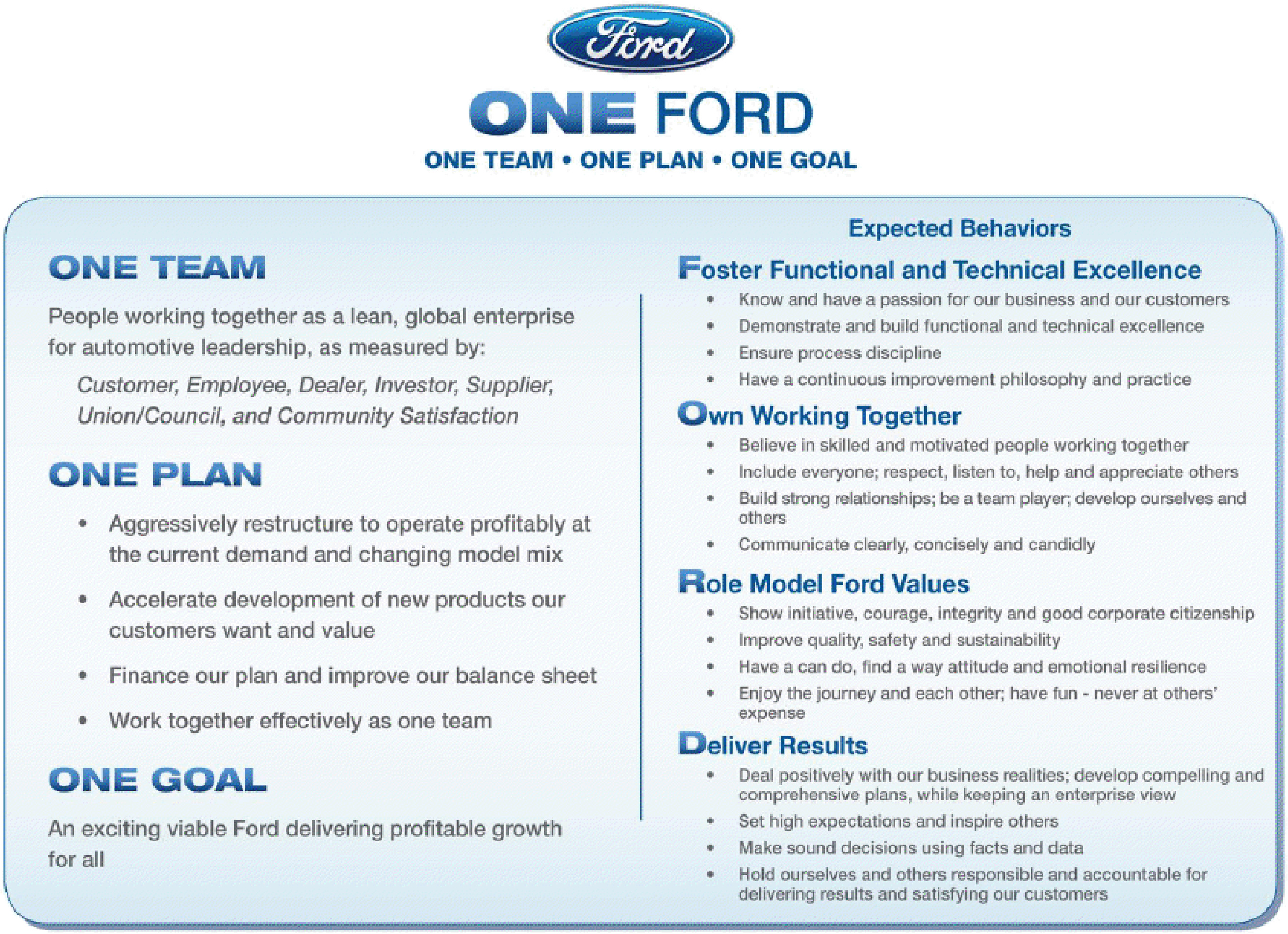
4) Corporate ethics.

Giving the importance to not only the compliance with law, but also with corporate ethics.

In above I wrote as "Japanese" Mission Statement. Because I feel the difference in Japanese and European or US.

So let's look at the difference in some examples.

Mission Statement of Ford (From the homepage of Ford Motor Company).



ONE FORD

ONE TEAM • ONE PLAN • ONE GOAL

ONE TEAM

People working together as a lean, global enterprise for automotive leadership, as measured by:

Customer, Employee, Dealer, Investor, Supplier, Union/Council, and Community Satisfaction

ONE PLAN

- Aggressively restructure to operate profitably at the current demand and changing model mix
- Accelerate development of new products our customers want and value
- Finance our plan and improve our balance sheet
- Work together effectively as one team

ONE GOAL

An exciting viable Ford delivering profitable growth for all

Expected Behaviors

Foster Functional and Technical Excellence

- Know and have a passion for our business and our customers
- Demonstrate and build functional and technical excellence
- Ensure process discipline
- Have a continuous improvement philosophy and practice

Own Working Together

- Believe in skilled and motivated people working together
- Include everyone; respect, listen to, help and appreciate others
- Build strong relationships; be a team player; develop ourselves and others
- Communicate clearly, concisely and candidly

Role Model Ford Values

- Show initiative, courage, integrity and good corporate citizenship
- Improve quality, safety and sustainability
- Have a can do, find a way attitude and emotional resilience
- Enjoy the journey and each other; have fun - never at others' expense

Deliver Results

- Deal positively with our business realities; develop compelling and comprehensive plans, while keeping an enterprise view
- Set high expectations and inspire others
- Make sound decisions using facts and data
- Hold ourselves and others responsible and accountable for delivering results and satisfying our customers

Next Toyota.

Basic Philosophy (Toyota Industries' Corporate Philosophy)

■ **Respect for the Law**

Toyota Industries is determined to comply with the letter and spirit of the law, in and outside of Japan, and to be fair and transparent in all its dealings.

■ **Respect for Others**

Toyota Industries is respectful of the people, culture, and tradition of each region and country in which it operates. It also works to promote economic growth and prosperity in those countries.

■ **Respect for the Natural Environment**

Through its corporate activities, Toyota Industries works to contribute to regional living conditions and social prosperity and also strives to offer products and services that are clean, safe, and of high quality.

■ **Respect for Customers**

Toyota Industries conducts intensive product research and forward-looking development activities to create new value for its customers.

■ **Respect for Employees**

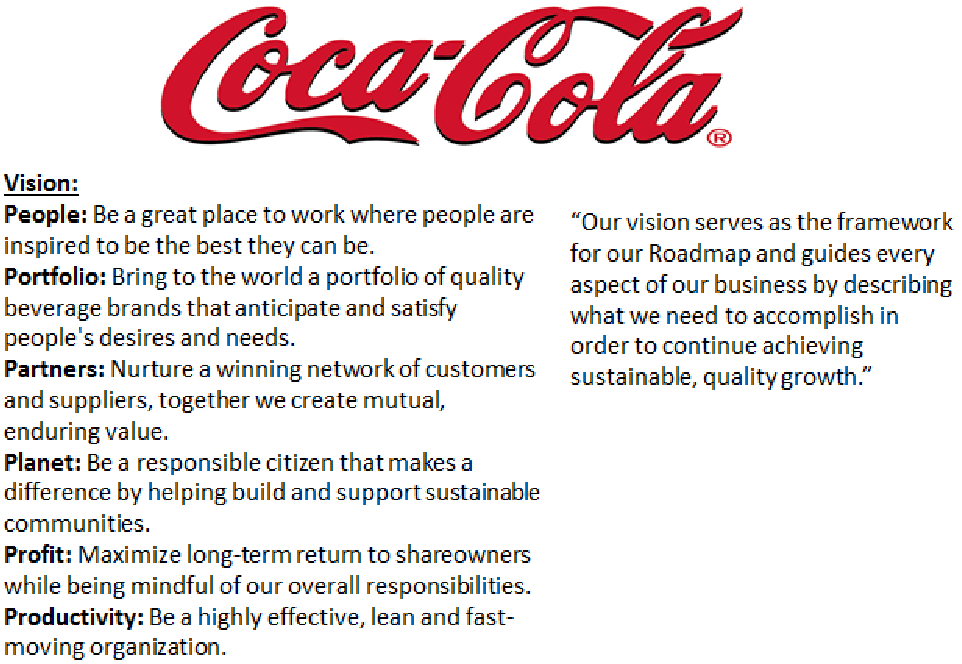
Toyota Industries nurtures the inventiveness and other abilities of its employees. It seeks to create a climate of cooperation, so that employees and the Company can realize their full potential.

(Above from the homepage of TMC.)

There is a thought of CSR (Corporate Social Responsibility) in US. Of course in Japan also these is the word and thought.
In Japan it is understood as follow.

> Corporate Social Responsibility: a company has the responsibility of social contribution in one of point of view of corporate ethics.

And in the Japanese mission statement there are the factors of corporate ethics and CSR.
The comparison of company's philosophy is very interesting. And as you aware when comparing the corporate philosophy (creed, motto) in Ford and Toyota, of course very much different.
I do not compare which is better. However.
There is the different trend between Japan and US.
Let's look at another one example.
Coca-Cola.



Vision:

People: Be a great place to work where people are inspired to be the best they can be.

Portfolio: Bring to the world a portfolio of quality beverage brands that anticipate and satisfy people's desires and needs.

Partners: Nurture a winning network of customers and suppliers, together we create mutual, enduring value.

Planet: Be a responsible citizen that makes a difference by helping build and support sustainable communities.

Profit: Maximize long-term return to shareowners while being mindful of our overall responsibilities.

Productivity: Be a highly effective, lean and fast-moving organization.

"Our vision serves as the framework for our Roadmap and guides every aspect of our business by describing what we need to accomplish in order to continue achieving sustainable, quality growth."

By the way
I teach the 3Ss (again) in the Factory Management course.
In here 3Ss is not the meaning of Seiri Seiton Seiso, but the meaning of Customer's satisfaction, Employee's satisfaction and Society's satisfaction.
And I think that a corporate philosophy should have these 3Ss as essential factors.
I teach that a mission statement is the "Meaning to exist (Raison d'etre)" of the company.
Why is a company philosophy important?
Recently there were very interesting (sad and disappointed) news which are the Panama Paper, Volkswagen (Problem of falsehood of exhaust gas regulation).
And it is brought to light the same fraud (Problem of falsehood of exhaust gas regulation) of Mitsubishi Motors Corporation.
Mitsubishi is of course Japanese company. And I feel that it is indeed woeful.
Why are such things which are related to the companies or persons moral and ethics occurred?
About the issue of Panama Paper, there are the names of hundreds Japanese persons (230) and companies (20).
And a trading company said with nonchalant air that "we don't do any illicitness".
On the other hand US Mr. President Barack Hussein Obama told that "It is itself the problem that it is not illegal".
Why are such immoral, shameful and unfair things occurred?
What corporate philosophy (creed, ethics) do they have? Just "Profit precedence"?
What corporate philosophy does Mitsubishi have? Let's look at it.

Corporate Philosophy

Mitsubishi Motors has drawn up a new corporate philosophy that both states the purpose of the company's existence and provides a clearer roadmap for its future direction. Adhering to "The Three Principles* " of the Mitsubishi group of companies, the new philosophy will serve as a touchstone for all activities conducted under the Mitsubishi Motors name. The central concepts of this philosophy are as follows:

Corporate Philosophy & Stance
Corporate Philosophy (formulated in January 2005)
"We are committed to providing the utmost driving pleasure and safety for
our valued customers and our community.
On these commitments we will never compromise. This is the Mitsubishi Motors way."
■Customer-centric approach
Mitsubishi Motors will give the highest priority to earning the satisfaction of its customers, and by doing so, become a company that enjoys the trust and confidence of community at large. To that end, Mitsubishi Motors will strive its utmost to tackle environmental issues, raise the level of passenger and road safety and address other issues of concern to car owners and the general public.
■A clear direction for the development and manufacturing of Mitsubishi Motors vehicles
The cars that Mitsubishi Motors will manufacture will embody two major concepts: "driving pleasure" and "safety". Mitsubishi Motors will manufacture cars that deliver superior driving performance and superior levels of safety and durability, and as such, those who use them will enjoy peace of mind.
■Going the extra mile
Mitsubishi Motors will pay close attention even to the smallest details in the belief that this approach will lead customers to discover new value in their cars, giving them a richer and more rewarding motoring experience.
■Importance of continuity
Mitsubishi Motors will continue to manufacture distinctive cars with the passion and conviction to overcome all challenges.
(Above from the homepage of MMC)

In Japan, Mitsubishi Motors had such scandal 3 times. And I doubt about the managerial posture, corporate ethics.
Originally the managerial stance should be regulated in the Mission Statement.
In Sumitomo and in his employee education, the Sumitomo philosophy is taught very deeply and frequently.
The Mission Statement must be shared by all employees (from bottom to top) and also society and customers.
And again a mission statement is the "Meaning to exist" also should be the mirror of ethics.

At the date of 1st Aug, the Special Investigation Committee which investigated the Mitsubishi's "Problem of falsehood of exhaust gas regulation" has published his report of 264 pages.
And in his report, he proposed that

> Prioritize Corporate Ethics than Profit.

And yesterday (23rd of Aug 2016), MMC published his thought and promised to re-establish the corporate ethics.

Why the necessity of corporate philosophy (mission statement) was born?
I would present one column written by the philosopher (Takashi Uchiyama)
Title of the column: Occupation (business) let human be decadent.

> I lived in countryside long years. In this year spring has come earlier than usual.
> In this year also the life of countryside is made unchangeably.
> The village life is busy unexpectedly. Field work, picking edible wild plants---.
> Also there are many events such spring festival, community work (Mowing, felling---),
> and also recently various planning in Saturday & Sunday.
> And very interesting point is that it is ambiguous that these events and planning are the jobs or the village life itself.
> If saying it is a job, it might be a job. If saying it is the life, it might be the village life.
> In the traditional society all are unified vaguely.
> Job and life are unified. And in related with these, the regional society and culture are formed. The faith and religion also are related to job and life.
> It was the traditional form of the lifeworld.
> However.
> Such unified life society is destroyed gradually in growing modern society.
> And the situation is changed to that Job is job, life is life, culture is culture and society is society separately.
> By this situation, occupation is established independently from the life, culture and society.
> And in this change, the epoch of giving importance of ethics of occupation was born.
> In the traditional society an occupation ethics was formed very naturally.
> The thought of occupation was formed generally because an occupation was related to other elements (society, culture, indigenous faith and life).
> Such relation which the occupation contains these and never allowed to destroy the society and life created the occupation ethics naturally.
> But.
> The occupational convenience and occupational (business) ethics become to put it on its feet independently in the situation of which business to be independent as only business.
> And in modern society the people who consider only his or his companies profit was born.

Additionally.
Even though he believes to work faithfully, the works and acts are in the narrow view of the world of only his occupation. And as the results the phenomenon which society is destroyed is occurred.
And unfortunately the people of such cases of Panama Papers, Volkswagen, and Mitsubishi Motors are increased.
(On the other hand there is a good news.)
The persons who notice the things became to devote their effort to make new business or volunteer activity for establishing the world which is related with his occupation, society culture and life each other.
Enterprises also become to make effort to the employee's social contribution activity.
A company encourages the social contribution activity such monthly street beautification. However. Such companies are still minority.
And the epoch which is unhappy and an occupation (business, profession, job) let human be decadent is coming if the situation is left.

From next I write Factory Management.
As I wrote in the beginning, from next I write the column of Factory Management.
And as the first I describe the total frame of Factory Management.
I know still I need to write TPS more deeply. However.
Once again I would tell you to leave from Lean, TPS a little while if you want to pursue true lean management.
And with through Factory Management, let us think the lean management and TPS (or TQM, TPM and Kaizen).